

INT-03-013

1. A LC oscillator device comprising:

a capacitor comprising:

a first plate comprising a conductive loaded,
resin-based material comprising conductive materials

5 in a base resin host; and

a second plate fixably held nearby but not
contacting said first plate such that said first plate
and said second plate are capacitively coupled; and
an inductor comprising a loop of said conductive

10 loaded, resin-based material.

2.The device according to Claim 1 wherein the ratio, by
weight, of said conductive materials to said resin host is
between about 0.20 and about 0.40.

3.The device according to Claim 1 wherein said conductive
materials comprise metal powder.

4.The device according to Claim 3 wherein said metal powder
is nickel, copper, or silver.

5.The device according to Claim 3 wherein said metal powder
is a non-conductive material with a metal plating.

6.The device according to Claim 5 wherein said metal plating is nickel, copper, silver, or alloys thereof.

7.The device according to Claim 3 wherein said metal powder comprises a diameter of between about 3 μm and about 12 μm .

8. The device according to Claim 1 wherein said conductive materials comprise non-metal powder.

9. The device according to Claim 8 wherein said non-metal powder is carbon, graphite, or an amine-based material.

10.The device according to Claim 1 wherein said conductive materials comprise a combination of metal powder and non-metal powder.

11.The device according to Claim 1 wherein said conductive materials comprise micron conductive fiber.

12.The device according to Claim 11 wherein said micron conductive fiber is nickel plated carbon fiber, stainless steel fiber, copper fiber, silver fiber or combinations thereof.

13.The device according to Claim 11 wherein said micron conductive fiber has a diameter of between about 3 μm and about 12 μm and a length of between about 2 mm and about 14 mm.

14.The device according to Claim 1 wherein said conductive materials comprise a combination of conductive powder and conductive fiber.

15.The device according to Claim 1 wherein said second plate comprises metal.

16.The device according to Claim 1 wherein said second plate comprises said conductive loaded resin-based material.

17.The device according to Claim 1 further comprising a dielectric material between said first and second plates.

18.The device according to Claim 17 wherein said dielectric material comprises a resin-based material.

19.The device according to Claim 17 wherein said dielectric layer further encapsulates said first and second plates.

20.The device according to Claim 1 wherein said first plate and said second plate comprise multiple material planes that are interlaced to increase parallel surfaces therebetween.

21.The device according to Claim 1 wherein one of said first and second plates further comprises a circuit trace on a molded circuit board.

22.The device according to Claim 1 wherein one of said first and second plates further comprises a part of a molded housing for an electrical device.

23.The device according to Claim 1 further comprising an electrically insulating layer surrounding said loop.

24. The device according to Claim 23 wherein said electrically insulating layer is a resin-based material.

25.The device according to Claim 1 wherein said loop further comprises a core structure located inside said loop wherein said core structure alters the inductance of said loop.

26. The device according to Claim 1 wherein said core structure comprises conductive loaded resin-based material.

27. The device according to Claim 26 wherein said conductive loaded resin-based material comprises an iron-based conductive load.

28. The device according to Claim 1 wherein said core structure comprises a metal.

29. The device according to Claim 1 wherein said loop comprises multiple turns of said conductive loaded resin-based material.

30. A LC oscillator device comprising:

a capacitor comprising:

a first plate comprising a conductive loaded, resin-based material comprising conductive materials in a base resin host; and

a second plate fixably held nearby but not contacting said first plate such that said first plate and said second plate are capacitively coupled; and an inductor comprising:

a conductive loop; and

a core structure located inside said loop wherein said core structure comprises said conductive loaded, resin-based material.

31.The device according to Claim 30 wherein the ratio, by weight, of said conductive materials to said resin host is between about 0.20 and about 0.40.

32.The device according to Claim 30 wherein said conductive materials comprise metal powder.

33.The device according to Claim 33 wherein said metal powder is a non-conductive material with a metal plating.

34. The device according to Claim 30 wherein said conductive materials comprise non-metal powder.

35.The device according to Claim 30 wherein said conductive materials comprise a combination of metal powder and non-metal powder.

36.The device according to Claim 30 wherein said conductive materials comprise micron conductive fiber.

37.The device according to Claim 30 wherein said conductive materials comprise a combination of conductive powder and conductive fiber.

38.The device according to Claim 30 wherein said second plate comprises metal.

39.The device according to Claim 30 wherein said second plate comprises said conductive loaded resin-based material.

40.The device according to Claim 30 further comprising a dielectric material between said first and second plates.

41.The device according to Claim 40 wherein said dielectric material comprises a resin-based material.

42.The device according to Claim 40 wherein said dielectric layer further encapsulates said first and second plates.

43.The device according to Claim 30 wherein said first plate and said second plate comprise multiple material

planes that are interlaced to increase parallel surfaces therebetween.

44.The device according to Claim 30 wherein one of said first and second plates further comprises a circuit trace on a molded circuit board.

45.The device according to Claim 30 wherein one of said first and second plates further comprises a part of a molded housing for an electrical device.

46.The device according to Claim 30 further comprising an electrically insulating layer surrounding said core structure.

47. The device according to Claim 46 wherein said electrically insulating layer is a resin-based material.

48.The device according to Claim 30 wherein said loop comprises conductive loaded resin-based material.

49.The device according to Claim 30 wherein said loop comprises multiple turns.

50. A method to form a LC oscillator device, said method comprising:

providing a conductive loaded, resin-based material comprising conductive materials in a resin-based host; and
5 molding said conductive loaded, resin-based material into said device.

51. The method according to Claim 50 wherein the ratio, by weight, of said conductive materials to said resin host is between about 0.20 and about 0.40.

52. The method according to Claim 50 wherein the conductive materials comprise a conductive powder.

53. The method according to Claim 50 wherein said conductive materials comprise a micron conductive fiber.

54. The method according to Claim 50 wherein said conductive materials comprise a combination of conductive powder and conductive fiber.

55. The method according to Claim 50 wherein said molding comprises:

injecting said conductive loaded, resin-based material
into a mold;

5 curing said conductive loaded, resin-based material;
and
removing said device from said mold.

56. The method according to Claim 55 further comprising
forming a dielectric layer over said device.

57. The method according to Claim 56 wherein said step of
forming a dielectric layer comprises over-molding.

58. The method according to Claim 56 wherein said step of
forming a dielectric layer comprises dipping, spraying, or
coating.

59. The method according to Claim 50 further comprising
forming a dielectric layer prior to said step of injecting
said conductive loaded, resin-based material into a mold
wherein said device is over-molded onto said dielectric
5 layer.

60. The method according to Claim 50 wherein said molding
comprises:

loading said conductive loaded, resin-based material
into a chamber;

5 extruding said conductive loaded, resin-based material
out of said chamber through a shaping outlet; and
curing said conductive loaded, resin-based material to
form said device.

61. The method according to Claim 60 further comprising
stamping or milling said molded conductive loaded, resin-
based material.

62. The method according to Claim 60 further comprising
forming a dielectric layer over said device.

63. The method according to Claim 62 wherein said step of
forming a dielectric layer comprises extrusion.

64. The method according to Claim 62 wherein said step of
forming a dielectric layer comprises dipping, spraying, or
coating.